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"We can think of Marattia as having come from Angiopteris by the fusion of sporangia"; "the fertile spike of Botrychium is not a whole leaf, but only a branch of the foliage leaf"; "Marattiales and Cycadofilices are two branches differentiated from Primofilices."

The taxonomic groupings in certain particulars seem to be more original than necessary. The Sphaerocarpaceae, including as a tribe the Rielleae, appear among the Marchantiales; the Jungermanniales Anacrogynae have become the Metzgeriales, leaving the Acrogynae only as the Jungermanniales; and many novel arrangements appear in the Bryales, which cannot be stated in detail. Of course the vascular groups presented are all "Diploidales," and the two principal divisions are the *Biciliaten* and the *Polyciliaten*. This naturally results not only in detaching Isoetes from the Lycopodiales, but also subordinates the boundary between pteridophytes and spermatophytes. There may be no objection to either of these results, but the single character used to secure them is more than questionable.

The bibliography is copious, but by the method of its presentation it is repetitious and not specific; nor is it so complete in its citations as one would expect from the editor of a bibliographical journal. The index is unfortunately double, but otherwise excellent, and puts the reader in easy command of the contents.—J. M. C. and C. R. B.

MINOR NOTICES

A flora of the Dutch West Indies.[3]—The first volume of this work deals with the flora of the islands of St. Eustatius, Saba, and St. Martin. The work is divided into three parts. The first part is concerned with taxonomy, the second presents a historical account of the flora, and the third deals with the phytogeography of the islands. The taxonomic portion is based mainly on the collections of SURINGAR, VAN GROL-MEYERS, LIONARONS, and BOLDINGH, whose collections are deposited either in the Rijks herbarium at Leiden, the herbarium at Utrecht, the Colonial Museum at Haarlem, or in the herbarium of KRUG and URBAN at Berlin. The sequence of the families and genera is essentially that of DE DALLA TORRE and HARMS'S *Genera Siphonogamarum*, and the nomenclature is in accordance with the International Rules adopted at Vienna in 1905. The taxonomy occupies the major part of the volume, covering over 200 pages, and consists of an enumeration of the species with reference to original publications, a very limited synonomy, and the citation of plants collected on the different islands. About 500 genera and approximately 800 species are recorded. The second part contains interesting and important historical matter, particularly as to itineraries of collectors and lists of their plants. The third part embraces detailed information as to the natural features of the islands, a series of tables on distribution, a bibliography, and finally an index to vernacular and scientific names. The volume is of moderate size and well printed, but the introduction of keys, especially in case of some of the larger genera, would have added somewhat to the usefulness of the work in the identification of species. Nevertheless, as a catalogue of the known species of the islands, it is a commendable contribution to taxonomic literature and will serve as an excellent basis for future studies on the flora of the region.—J. M. GREENMAN.

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[3] BOLDINGH, I., The flora of the Dutch West Indian Islands St. Eustatius, Saba, and St. Martin. Roy. 8vo. pp. xii+321. *maps 3.* Leiden: E. J. Brill. 1909.

Natürlichen Pflanzenfamilien.[4]—Parts 236 and 237 contain a supplement to the Conjugatae and Chlorophyceae by the distinguished algologist Professor N. WILLE. Two new genera are included, namely *Pseudopringsheimia* and *Pseudulvella* of the Chaetophoraceae; the former is based on *Ulvella confluens* Rosenv., an epiphyte growing on marine algae of the north Atlantic; the latter is based on *Ulvella americana* Snow, also an epiphyte, and occurs on freshwater algae of North America. Parts 238–240, likewise of recent issue, consist of a general index to Teil I of this great work.—J. M. GREENMAN.

NOTES FOR STUDENTS

The life history of Griffithsia.—LEWIS[5] has published a paper on the life history of *Griffithsia Bornetiana.* The paper begins with the presentation of the vegetative characters of the three different individuals of this species: antheridial, procarpic, and tetrasporic. The author records comparative studies of the size of the cells in the three individuals, discusses the nature of intercellular connections, describes the division of chromatophores, and calls attention to the phenomenon of an approximate simultaneous occurrence of the nuclear divisions in multinucleate cells. There are then described the development of antheridia, cystocarps, and tetraspores; the methods of vegetative propagation; germination of spores; and tetraspore-like structures on sexual plants. The paper closes with a discussion of results, in which the author presents his views on alternation of generations in Griffithsia.

Some of the cytological results are as follows. The nuclei in Griffithsia are throughout their history very poor in linin. The chromatin of the resting nucleus, therefore, is not distributed on a linin reticulum, but is chiefly contained in a centrally placed, homogeneous nucleolus or "karyosome." As regards the mode of formation of chromosomes, the chromatin passes out of the nucleolus until the whole chromatin content is distributed through the nuclear cavity in the form of granules. These granules are much more numerous than the chromosomes, and probably by the fusion of separate granules chromosomes are formed. The number of chromosomes in the nucleus of vegetative cells in the tetrasporic plant

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[4] ENGLER UND PRANTL, Die natürlichen Pflanzenfamilien, etc. 236 and 237 Lieferung. Conjugatae und Chlorophyceae von N. WILLE. Nachträge zum I. Teil, 2 Abt., Bogen 1–6, pp. 96; 238 bis 240 Lieferung. Register zu Teil I (vollständig), pp. 242. Leipzig: Wilhelm Engelmann. 1909. *M* 3, *M* 4.50.

[5] LEWIS, I. F., The life history of *Griffithsia Bornetiana.* Annals of Botany 23:639–690. *pls.* 49–53. 1909.